

CRAB SPIDERS (ARANEAE: THOMISIDAE)
PREYING ON SCARAB BEETLES
(COLEOPTERA: SCARABAEIDAE)

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ABSTRACT

Xysticus apachecus Gertsch crab spiders were collected feeding on adult *Diplotaxis* sp., *D. parvicollis* Fall, and *Phyllophaga (Listrochelus) falsa* (LeConte) scarab beetles on young *Pinus ponderosa* Laws. trees in Arizona. New records of prey, spider-habitat associations, and predators of scarab beetles are established by these collections.

Spiders are predators, the prey consisting chiefly of live invertebrates, especially insects. Some spiders spin webs or snares of silk for capturing food, while others rely on stealth and surprise. Crab spiders of the family Thomisidae are among the latter. They actively search plant surfaces, litter, and debris for prey, or they ambush insects from hiding places such as in flowers, or on foliage of trees and shrubs. Typical crab spiders of the subfamily Misumeninae have stout, robust front legs for seizing prey. Captured insects, including bumblebees and wasps much larger than the spiders, are quickly subdued with a powerful venom.

Crab spiders may ambush a variety of insects resident or visiting the habitats occupied by the spiders. Detailed studies are lacking concerning possible food habits or preferences of crab spiders. Most prey records are for flower-inhabiting crab spiders (Gertsch, 1939), while prey records of tree- and shrub-inhabiting species consist mainly of lepidopterous defoliators (Lough-ton, Derry, and West, 1963; Morris, 1972; Renault and Miller, 1972). There are few previous records of crab spiders preying on beetles. This paper reports collections of crab spiders found feeding on scarab beetles associated with ponderosa pine seedlings in Arizona. The spiders with beetle prey are deposited in the American Museum of Natural History, New York.

On 14 July 1971, 2 female *Xysticus apachecus* Gertsch crab spiders were collected on *Pinus ponderosa* Laws. foliage with scarab beetle prey. The collecting locality is ca. 5 miles southwest of the Chevelon Ranger Station in sec. 34, T13N, R13E, Chevelon Ranger District, Sitgreaves National Forest, Coconino County, Arizona; elevation ca. 7,300 feet. The pine trees are part of a naturally regenerated ponderosa pine stand that became established following an intensive and devastating forest fire, the Dudley Burn, that swept through the area in June 1956. One spider had captured a male *Diplo-taxis* sp. in a 7.6 ft. tree. Because the head of the scarab beetle was missing at the time of collection, specific identification was not possible. On a nearby

¹Forest Service, U.S. Department of Agriculture, with central headquarters maintained at Fort Collins in cooperation with Colorado State University; author is located at Albuquerque in cooperation with the University of New Mexico.

pine, 9.3 ft. in height, another *X. apacheus* was feeding on a male *Phyllophaga (Listrochelus) falsa* (LeConte). Both spiders were on foliage in the upper crowns of the trees, near the apices of lateral branches. Crab spiders were seen with out-stretched front legs in such foliage on numerous other occasions, presumably waiting for insects.

A third example of a crab spider feeding on a scarab beetle was observed on 19 July 1971 when Herbert Allen Pase, III, collected a female *X. apacheus* feeding on a female *Diplotaxis parvicollis* Fall. This collection was made in the same general locality as the other 2 collections, but in sec. 23, T13N, R13E of the Dudley Burn, ca. 2.5 miles southwest of the Chevelon Ranger Station, elevation 7,200 feet. The spider with beetle prey was on a ponderosa pine seedling, height ca. 3 ft. All 3 observations are new prey records for *X. apacheus*.

The distribution of *X. apacheus* includes Utah, Arizona, Colorado, New Mexico, Texas, and California (Gertsch, 1939, 1953; Schick, 1965). Previous records of this crab spider on *Pinus ponderosa* foliage are lacking. Distributions of the scarab beetles include Mexico, New Mexico, Colorado, Utah, California, and Arizona for *P. falsa* (Butler and Werner, 1961) and Colorado, New Mexico, Arizona, and Mexico for *D. parvicollis* (Vaurie, 1960).

Although spiders are not included among the natural enemies of scarab beetles given by Ritcher (1958), Davis (1919) reported 3 species of spiders preying on scarabs, including the crab spider *Xysticus gulosus* Keys. feeding on *Phyllophaga futilis* (LeC.). Exline and Hatch (1934) observed *Odontaeus* [now *Bolboceras*] *obesus* LeC. and *Diplotaxis brevicollis* LeC. in webs of the black widow, *Latrodectus mactans* (Fabr.).

The species of scarabs captured by crab spiders may be of economic importance in areas where survival of natural and planted ponderosa pine seedlings is critical. Adults of *P. falsa* have been taken in Arizona several times on ponderosa pine in July and August (Butler and Werner, 1961). Saylor (1940) reported that larvae of these beetles did extensive damage to pine seedlings at Flagstaff, Arizona, by cutting off the tree roots. Chapin (1934) described *Listrochelus langeri* (a synonym of *P. falsa*), and stated that it injures foliage of *Pinus ponderosa*.

It is not known whether the adults of *Diplotaxis* sp. and *D. parvicollis* feed directly on ponderosa pine foliage or merely visit pine trees in the vicinity of other food sources. General information regarding the feeding habits of *Diplotaxis* indicates that the adults probably feed on pine foliage, while larvae feed on the roots or rootlets of pine seedlings. Vaurie (1960) included *Pinus* among the habitats where she collected adult *Diplotaxis*, and Arnett (1963) reported that adults of *Diplotaxis* are nocturnal and feed mostly on conifers, with pines being the preferred food. Larvae of *Diplotaxis* fed on the roots of coniferous seedlings under experimental conditions, but they destroyed less than 20% of the pine seedlings used in the experiments (Craighead, 1950).

The extent and frequency of crab spider predation on scarab beetles are not known. Carcasses of scarab beetles were frequently seen near the tips of branches in the upper crowns of young pines on the Dudley Burn. *Xysticus apacheus* is an ambushing crab spider that does not move rapidly over the foliage in search of prey. The positioning of these spiders at the apices of upper crown branches is probably advantageous for capturing flying insects, including these scarabs, that alight on these extremities. No doubt these spiders prey on other insects besides scarab beetles.

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